



Hazen and Sawyer
4011 WestChase Boulevard, Suite 500 • Raleigh, NC 27607

Exhibit A

October 6, 2015

Mr. Brian Sessoms, PE
Civil Engineer III
City of Durham – Water Management
1600 Mist Lake Drive
Durham, North Carolina 27704

Re: East/West Reinforcing Main Route Study, Scope of Work and Fee

Dear Mr. Sessoms:

We are pleased to provide the below scope of work and fee for the routing study and Preliminary Engineering Report (PER) for the final phase of the East/West Reinforcing Main (EWRM). The portion of the EWRM requiring study and preliminary engineering is the 3rd phase of transmission improvements proposed to improve the water transmission capacity between the Williams WTP, the Ellis Tank and the Southern Reinforcing Main, and allow for old mains in undesirable locations to be removed from service. Improved hydraulic capacity between the East Durham Tank and the Southern Reinforcing Main is also required as part of this project, with coordination with the ongoing transmission main work in the area of Alston Avenue. The western end of the study area is at the intersection of Main Street and Peabody Street. Figure 1 attached illustrates the general study area.

The proposed transmission improvement is as generally described in a series of technical memoranda prepared by Hazen and Sawyer (Hazen), with the more recent being dated January 29, 2015. The most recent memo established northern and southern boundaries for the potential transmission main routing that serves the intended purpose of improving transmission capacity between the Williams WTP and the southeastern portions of the system.

The scope of work herein is separated into the following key parts:

- Meetings
- Route Development and Evaluation
- Ancillary Services to Route Evaluation
- Workshops and Deliverables
- Additional Services
- Schedule
- Fee

Hazen, referred to as ENGINEER herein, will provide the below detailed scope of services, schedule and fee:

A. Meetings

1. ENGINEER shall conduct a kick-off meeting with the OWNER upon receipt of Notice to Proceed and prior to beginning further services. Meeting shall include the following:
 - a. Review of key project objectives.
 - b. Review of detailed work plan.
 - c. Set dates for progress meetings and workshops.
 - d. Develop a risk register to identify known or potential risks for tracking, to include but not be limited to the following:
 - i. Environmental impacts
 - ii. Community impacts – direct and cumulative
 - iii. Constructability
 - iv. System performance during implementation
 - v. Long-term maintenance and operations
 - e. Identify known likely stakeholders and preliminarily define the outreach needs for each.
 - f. Develop public outreach plan, with an emphasis on activities that may be required during Preliminary Engineering Report (PER) development.
2. ENGINEER shall conduct monthly and periodic meetings as needed to review critical items or to solicit input from the OWNER.

B. Route Development and Evaluation

1. Complete a desktop and on-site site review of the study area to determine known areas of concern or benefit based on readily available information. Information to be considered will include the following:
 - a. environmentally sensitive locations (UST's, known contamination, natural resources, etc.),
 - b. areas of community construction fatigue,
 - c. recently or pending paved locations that would fall within the City moratorium as well as Powell Bill resurfacing locations,

- d. recent or pending NCDOT resurfacing locations,
 - e. railroad corridors (both parallel and abandoned),
 - f. trenchless crossing locations for major roadways, controlled access highways, and railroad corridors,
 - g. city staff (current and prior) identified undesirable corridors,
 - h. undesirable locations based on NCDOT, Durham Planning, or Durham Public Works discussions (road widening, etc.),
 - i. future Jordan Lake Partnership finished water main delivery locations,
 - j. Triangle Transit Authority construction,
 - k. two-way traffic conversion areas,
 - l. constructability,
 - m. opportunities to improve hydraulic capacity along Buchanan Blvd, and
 - n. opportunities to replace the existing piping in Ramseur Street
2. Complete a high level screening of the project study area based on screening items and weighting identified. The screening process will be utilized to identify specific locations or general areas that are desirable/undesirable within the study area. This screening results will be utilized to develop potential corridors through the study area to investigate further. A maximum of four (4) corridors will be identified for further consideration with a preference for identifying routes in broad geographic areas. A northern corridor shall incorporate the limits of the abandoned railroad spur. A central corridor shall include Pettigrew Street and Ramseur Street.
3. Conduct WORKSHOP NO. 1 as identified in D.1.a.
4. Develop a general feasible route for each of the developed corridors which are agreed upon in WORKSHOP NO. 1. Routes will be identified based on field investigation of identified corridors by the ENGINEER and will consist of a more refined general path through the previously identified corridors that may include a multi-block area in some locations. A route along Pettigrew Street (East of Roxboro Road) and Ramseur Street will be advanced to sufficient detail to allow costs to be developed for that route, and will be compared to the other routes that may prove to be desirable or possible.
5. Conduct WORKSHOP NO. 2 as identified in D.1.b.
6. Complete a detailed relative analysis of all defined routes identified and agreed upon in WORKSHOP NO. 2. This analysis will include consideration of the following:
- a. Community impacts to citizens and visitors of Durham including:
 - i. Disturbances to landowners or businesses,

- ii. Impact to traffic and pedestrians along the corridor,
 - iii. Impact to residential areas,
 - iv. Identify likely night work areas,
 - v. Impact to cultural events.
 - b. Economic and engineering impacts affecting overall cost and constructability of the developed routes including:
 - i. relative space for installation at critical locations along the alignment,
 - ii. location and quantity of trenchless crossings of major roadways or railroads,
 - iii. easement acquisition requirements,
 - iv. reconnections to existing water infrastructure,
 - v. Hydraulic considerations of the main as they pertain to the overall system performance, future water supply alternatives from Jordan Lake, reinforcement of the hydraulically deficient areas in the vicinity of Buchanan Blvd, and impacts to the scope of the American Tobacco District redevelopment proposed system improvements. (see section C.1)
 - 7. Provide limited subsurface utility engineering (SUE) and survey services at critical locations along the proposed route alternatives. Work will be provided to ascertain the available space for construction of a large diameter water main at critical locations. A total of twenty (20) locations are assumed along the prospective routes.
 - 8. Provide limited geotechnical evaluations that are determined to be warranted to better define the suitability of trenchless construction methods, and their estimated cost. A total of ten (10) borings are assumed to be required.
 - 9. Develop an opinion of probable construction cost for each route identified. Opinions of cost shall be provided with a contingency of 20% during the route assessment phase to account for unknowns at this stage of alternative development. An opinion of cost for the installation of the main along Pettigrew Street shall be developed regardless of its inclusion as a proposed route.
 - 10. Develop a list of required permits that would be anticipated for the construction of the proposed EWRM. List shall include agency, permit required, and contact information where available.
 - 11. Conduct WORKSHOP NO. 3 as identified in D.1.c.
- C. Ancillary Services to Route Evaluation
- 1. Provide the following hydraulic modeling services.

- a. Modeling of the proposed route alternatives developed in WORKSHOP NO. 2. Modeling will include assessment of overall system performance based on the proposed routing of each alternative and verification of the appropriate size for the East West Reinforcing Main. Additionally, assessment of required connections to existing infrastructure along the developed alternatives will be considered relative to operation of the system as well as future Jordan Lake water supply based on finished water being delivered to the City of Durham.
 - b. Modeling of the mains included in the American Tobacco District redevelopment project. Modeling will be performed to determine appropriate sizing of the mains within the ATD project area to provide a minimum of 3,500 gallons per minute of fire flow at all intersection within the ATD project limits.
 - c. Modeling of the existing system to determine the ability to reduce the number of water main crossings of the railroad right-of-way between Ramseur Street and Pettigrew Street between Chapel Hill Street and Roxboro Street.
 - d. Modeling of the existing system to evaluate opportunities for abandonment or replacement of the existing transmission main in Ramseur Street following installation of the proposed EWRM.
2. The ENGINEER shall attend up to two (2) public meetings for review of the proposed routings. The ENGINEER shall prepare necessary documents and presentation material for the meetings and provide technical support as needed (projectors, laptops, display boards, etc.).
 3. Provide onsite outreach services for notifications to affected property owners where survey, geotechnical investigations or SUE is determined to be required for development of the PER. ENGINEER shall develop and deliver direct mail notices to identified properties upon the authorization to do so by the OWNER.
 4. 3rd Party Agency Meetings: The ENGINEER shall attend meetings with agencies outside of the Department of Water Management. These meetings will be held either at the location of the agency or at the Department of Water Management. The ENGINEER shall prepare necessary documents and presentation material for the meetings and provide technical support as needed (projectors, laptops, etc.) Meetings will include:
 - a. City of Durham Department of Public Works (2)
 - b. Durham City/County Department of Planning
 - c. Triangle Transit Authority
 - d. NCDOT (2)
 - e. Railroad
 - f. Utility Companies (10)

D. Workshops and Deliverables

1. ENGINEER shall conduct workshops at critical points during the overall route and Preliminary Engineering Report development. For the purposes of this document and the workshops described below the term corridor, shall be defined as multi-street continuous areas which extend from the study beginning point to the study endpoint. Routes shall be defined as specific street level locations identified within a larger corridor that correspond to a potential location for the future main. Workshops will consist of multimedia presentations of the material to be covered with interactive discussions. Planned workshops shall consist of the following:
 - a. WORKSHOP NO. 1 - Review initial desktop and site visit findings, screening criteria and weighting of proposed criteria for corridor development, and review the overall screening results and associated corridors identified based on the screening.
 - b. WORKSHOP NO. 2 – Review identified potential routes within developed corridors to develop consensus prior to initiating more detailed street level evaluations that may include subconsultant field work.
 - c. WORKSHOP NO. 3 - Review more detailed evaluations of selected route alternatives including constructability and economic assessments.
 - d. WORKSHOP NO. 4 - Review the draft Preliminary Engineering Report (PER).
2. Upon completion of WORKSHOP NO. 3 develop a draft Preliminary Engineering Report (PER) to document and compile information and decisions made during the EWRM routing study. The PER shall include detailed discussion of the process utilized for determination of the final recommended routing including all information utilized for criteria development, screening of the route area to determine appropriate corridors, ultimate corridors selected for review, economic and engineering evaluations of identified routes, a final recommendation for the pipeline routing suitable for commencement of design, and identification of permits and approvals required for the selected route. An opinion of probable construction cost shall be provided for the recommended route with a project contingency of 15%. Detailed GIS figures will be provided as needed to present alternative routes. Five (5) hard copies will be provided for comment. The draft PER will be reviewed at WORKSHOP NO. 4.
3. A final draft will be provided which incorporates comments received by the City during a formal review as well as comments received at WORKSHOP NO.4. Ten (10) hard copies will be provided as well as searchable pdf electronic copies on CD.

E. Additional Services

If authorized in writing by OWNER, ENGINEER shall furnish or obtain from others Additional Services that are required for project completion but not included in the scope of work described above, or the corresponding fee for Additional Services. Costs for Additional Services will be paid for by OWNER as agreed upon by the OWNER and ENGINEER at the time the work is

defined and authorized for completion. Additional services may include, but are not limited to, the following:

1. Preparation of applications and supporting documents for: private or governmental grants, loans (to include State Revolving Funding (SRF)) or advances in connection with the Project; preparation or review of Environmental Assessments and Environmental Impact Statements required by the North Carolina State Environmental Policy Act; review and evaluation of the effects on the design requirements for the Project of any such statements and documents prepared by others; and assistance in obtaining approvals of authorities having jurisdiction over the anticipated environmental impact of the Project.
2. Services resulting from OWNER'S request to evaluate alternatives in addition to those identified in items A through D above.
3. Undertaking investigations and studies including, but not limited to: detailed consideration of operations, maintenance, and overhead expenses; the preparation of feasibility studies, cash flow and economic evaluations, rate schedules, and appraisals; assistance in obtaining financing for the Project; detailed quantity surveys of materials, equipment, and labor; and audits or inventories required in connection with construction performed by OWNER.
4. Providing assistance in resolving any Hazardous Environmental Condition in compliance with current Laws and Regulations, to include any Phase I or Phase II site assessments.
5. Preparing to serve or serving as a consultant or witness for OWNER in any litigation, arbitration or other dispute resolution process related to the Project.
6. Other services performed or furnished by ENGINEER not otherwise provided for in this Agreement.

F. Schedule

- The ENGINEER shall complete the Preliminary Engineering Report (PER) within 10 months of being issued a Notice to Proceed by the City of Durham. Milestone tasks are listed in the table below.

Milestone	Time to Completion	Start Prompt
Kick-off Meeting	14 days	Notice to Proceed
Corridor Development and Workshop No. 1	45 days	Conclusion of Kick-off Meeting
Route Development and Workshop No. 2	45 days	Approval of Corridors by DWM
Detailed Relative Route Analysis and Workshop No. 3	90 days	Approval of Routes by DWM
Draft PER Preparation and Workshop No. 4	60 days	Approval of Relative Route Analysis by DWM
Final PER	45 days	Receipt of Comments from DWM

G. Fee

- The ENGINEER shall complete the scope of work described herein for the compensation detailed in the table below. Cost ceiling work will be paid based upon salary cost times a multiplier of 3.15 for Hazen employees and cost plus a 5% markup for subconsultants. A detailed cost breakdown is attached as Figure 2.

Task	Lump Sum		Cost Ceiling		Totals
	Hours	Cost	Hours	Cost	
Project Management	55	\$9,300	0	\$0	\$9,300
Meetings	134	\$20,758	0	\$0	\$20,758
Route Development and Evaluation	531	\$69,742	52	\$62,564	\$132,306
Ancillary Services to Route Evaluation	168	\$26,710	139	\$21,720	\$48,430
Workshops and Deliverables	560	\$79,204	0	\$0	\$79,204
Totals	1,448	\$205,714	191	\$84,284	\$289,998

Very Truly Yours,

Stephen D. Leitch, PE
Associate

Enclosure

cc: Mr. Bryant Green, PE
Mr. Tom Tant, PE